



NATIONAL WEATHER SERVICE, LAS VEGAS NEVADA

# The Desert Sun

## SKYWARN Spotter Newsletter

**Fall 2010**

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This newsletter serves the following counties:

Nevada: Clark, Lincoln,  
Nye, Esmeralda

Arizona: Mohave

California: Inyo,  
San Bernardino

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## Spotter News

Andy Gorelow, Storm Spotter Coordinator

The 2010 Spotter training season has officially ended with over 100 new spotters trained and close to 200 people in attendance. Classes were held in Las Vegas, Pahrump, Needles, Panaca, Kingman, Bishop, Moapa, and Morongo Valley. There have been several people asking if there will be an online spotter training session for those who were unable to attend the classes. I am going to try and set up at least one within the next couple of months and I will send out an email with all the details. Although this monsoon season was relatively quiet, I would like to thank all the spotters for your time and effort in getting us reports. We have also received dozens of pictures from this monsoon season and we do appreciate that. Everyone in our office enjoys looking at the pictures and it also helps us in our storm verification. Remember to include whether or not we can use them in our spotter newsletters, or in spotter training materials. Pictures always add credibility to our warnings, and having that visual is extremely helpful during training. Even the funny pictures (weather related) are nice to get. Also, if you know of certain areas that are prone to flooding, such as intersections or low water crossings, please send me an email. We are trying to put together a database of all these areas which will help us in the future, especially during thunderstorm season. If you have any questions please email me at [andy.gorelow@noaa.gov](mailto:andy.gorelow@noaa.gov), or call the office at 1-702-263-9744. Thank you for your time and we appreciate your effort. No specific training locations have been determined for next year, but we will hopefully get a list out by early next year. Although the guidelines state that training should be every two years, we know that sometimes that isn't possible. I do want everyone to know that you will not be dropped from the spotter program due to lack of refresher training. Thanks again for your effort.

## September is National Preparedness Month

For additional information go to [WWW.READY.GOV](http://WWW.READY.GOV)

- 1) **Get a kit**
- 2) **Make a plan**
- 3) **Be Informed**

## **An Important Weather Data Source Coming to Las Vegas!**

**Mike Staudenmaier, MIC**

The vast amount of data the NWS needs in order to provide high quality products and decision support services comes not only from surface observations and spotters, but also comes from balloons that are launched into the atmosphere. Did you know that twice a day, over 800 sites around the world launch a weather balloon at nearly the same time to gather data about what is going on in the atmosphere? The NWS launches the most number of weather balloons of any other government in the world! We run or support 92 sites in North America and the Pacific region, and another 10 sites in the Caribbean.



Starting early next year, your NWS office in Las Vegas will assume responsibility for the upper air data collection from the prior location (Desert Rock, NV). Around the world, routine upper air launches occur 45 minutes before the official observation time of 0000 UTC and 1200 UTC (which is 500 am/pm during PDT and 400 am/pm during PST here in Las

Vegas). This is done to provide an almost instantaneous snapshot of the atmosphere worldwide at two specific times each day. These data are then used in numerical prediction models and directly by forecasters to provide vital atmospheric information to improve forecasts, warnings, and other decision support services.

So what does a weather balloon look like, and what variables are measured? A latex balloon is filled with either helium or hydrogen to provide a specified amount of lift needed to carry a package of instruments (called a radiosonde) through the atmosphere. The radiosonde (example shown upper left) has instruments which measure pressure, altitude, geographical position (through GPS), temperature, relative humidity, and wind. This data is then radioed back to a receiving antenna at the launch facility office. In addition to the balloon and the package of instruments, a parachute is also attached between the two, connected by a measured length of string. At the appropriate time, the entire train of items is launched into the atmosphere to begin its ascent (see picture right).



The inflated balloon typically has a diameter of about 6 feet at the earth's surface. As it rises through the atmosphere, the pressure outside the balloon decreases, which allows the balloon to expand outward (since the pressure remains essentially the same inside the balloon). Thus, the balloon gets bigger as it continues to rise in the atmosphere. By the time it reaches its target height of approximately 100,000 feet, the balloon can be over 30 feet in diameter! By this point, it is stretched very thin and eventually bursts. When this occurs, the parachute deploys, ensuring that the radiosonde returns to the ground gently. By that point, the entire package may have drifted only a few miles from the launch site, or as much as 50 to 100 miles away if winds aloft are strong! The NWS does not have the resources available to retrieve the balloons or instrument package, so included with the package is information on how to return the materials (if found) to a reclamation facility. About 20 percent of these packages are located and returned to the facility for reconditioning and reuse. So if you see one lying around when you're out on a hike or exploring a remote location, you'll know what it is and what to do with it! We are looking forward to having this important program moved to our office, and being able to provide this data toward achieving the NWS's mission of protection of life and property and enhancement of the Nation's economy.



Lightning strike from Central Hill in Kingman, AZ on the evening of July 30, 2010. Photo Courtesy: Herberta Schroeder.

## **Monsoon 2010: A Bust For Most**

**Chris Stachelski**  
**Forecaster**

“Where’s the rain?” was a common question asked by most folks in the Mojave Desert and southern Great Basin during the 2010 monsoon. Although the vast majority of the area experienced one of the driest monsoon seasons on record, a few locations did record above normal totals. The 2010 monsoon season in our area was characterized as a late-starter and early finisher that in between had a hard time getting moisture to push west of the Colorado River.

The weather pattern in the upper levels of the atmosphere finally became favorable to allow for a push of mid-level moisture northward by July 8<sup>th</sup>. This was the first real push of monsoonal moisture into the area for the year. Although a few areas of mainly Mohave and Lincoln Counties as well as the Spring Mountains of Clark County did see showers develop in the afternoon and evening hours between the 8<sup>th</sup> and 11<sup>th</sup>, precipitation amounts were generally light as is typical with early season monsoon activity.

After a brief break, moisture began to move back into the area around July 15<sup>th</sup> and this time was able to spread farther west into San Bernardino County. While the western part of the Mojave Desert dried out quickly, moisture remained over eastern areas into the later third of the month. On the 23<sup>rd</sup>, a push of deeper moisture worked into Mohave, Lincoln and to a lesser extent Clark County. This deeper moisture remained over these areas through the close of July. This deeper moisture resulted in wetter storms that thus triggered a few reports of flash flooding. On the 23<sup>rd</sup>, an intense thunderstorm developed late in the morning over Hualapai Mountain, AZ, and unleashed 2.13 inches of rain in 30 minutes. The intensity of the rain in a short time period led to flash flooding with rocks and other small debris covering the Hualapai Mountain Park road. In addition, three-quarter inch diameter hail also fell from this storm.

July 2010 would finish as one of the driest months on record for much of the area with vast stretches seeing no rain at all for the entire month. Needles, CA, had only their fifth July on record dating back to 1948 with no precipitation at all. The 0.01 inch measured at the Kingman Arizona Airport made it the seventh driest July on record dating back to 1901. In Las Vegas, McCarran International Airport received just a trace for the month; however a few neighborhoods on the west and southeast sides of the valley did record measurable precipitation. The highest amount in the Las Vegas Valley for July was 0.20 inch recorded in east Henderson.

August brought the area more showers from the monsoon, however, large parts of the area still recorded below normal precipitation for the month. There were three main time frames when the monsoon was very eventful in August. The first took place on the 7<sup>th</sup> into the 8<sup>th</sup> as an upper level trough approached from the west and eventually moved across the area. This trough helped to enhance thunderstorm development especially on the 8<sup>th</sup> across Mohave, Lincoln and Clark Counties. Several storms developed in Clark County that produced flash flooding and a few even produced hail. The largest hail reported during this event was 1 inch in diameter on Interstate 15 between Moapa and Mesquite which resulted in dents to several vehicles. In addition, lightning from a separate thunderstorm that day struck and destroyed a house in the northwest part of Las Vegas causing \$200,000 in damages. While rainfall was not heavy from all of the storms on the 7<sup>th</sup> and 8<sup>th</sup>, locally heavy amounts did fall. An automated gauge near Laughlin, NV, recorded 2.80 inches while the observer at Cathedral Gorge State Park, NV, measured 2.90 inches.



Flash flooding in Meadview, AZ on the afternoon of July 17<sup>th</sup>. Over two feet of water flooded some areas.  
Photo Courtesy: Fire Station 43.

Another push of moisture headed into the area from August 16<sup>th</sup> and 17<sup>th</sup> sparking off scattered thunderstorms across Mohave, Clark and Lincoln Counties and the deserts of San Bernardino County on the afternoon of the 17<sup>th</sup>. Thunderstorms popped up over Meadview, AZ, and dumped over 2 inches of rain resulting in significant flash flooding in the community with floodwaters over two and a half feet at one point (see picture above). The floodwaters took out several small shrubs and signs and undermined a driveway. While flooding was the main impact from this storm it was not the only. Wind gusts estimated up to 60 mph tore the roof off a mobile home and hail as large as dime size fell. Later that day, another thunderstorm produced 1 inch hail near Barstow and also produced 60 mph wind gusts that blew a tractor trailer off Interstate 15.

The final push of moisture into the area at the end of the month was the most active period for the monsoon for this season. The last several days of August and first several days of September traditionally tend to be the most highly active period for the monsoon in our area and this year was no exception. On the afternoon of the 24<sup>th</sup>, a thunderstorm produced nickel size hail and 70 mph winds in Wikieup that knocked down trees and power lines. One resident of the community described the storm as being reminiscent of “a Category 1 hurricane.” On the 25<sup>th</sup>, flash flooding occurred in Cima and Yucca Valley, CA, with water covering roads in both communities. However, the most active day of the summer in terms of aerial coverage was on the 26<sup>th</sup> when thunderstorms developed by midday across much of our forecast area. Hardest hit were Inyo and San Bernardino Counties where significant flash flooding took place. Several roads were flooded in and near Death Valley National Park and in Barstow. One inch of rain was measured in Barstow in 25 minutes by a co-op observer.



However, the most significant event of the day took place when a thunderstorm developed in the eastern Sierra Nevada over an area where a wildfire occurred several years ago. The intensity of the rain in a steep, narrow canyon over a burned area triggered a flow of mud that ran down the slope of the Sierra and onto Highway 395 between Dunmovin and the Haiwee Reservoir. The wall of mud, described as 3 to 4 feet high and up to 200 feet wide, crossed Highway 395 and floated a tractor trailer truck off the highway and into a ditch, burying it in mud. All lanes of Highway 395 were reopened to traffic the following morning. Finally on the 27<sup>th</sup>, an upper-level disturbance moved across the area and resulted in thunderstorms firing up from around the Colorado River Valley eastward. One thunderstorm blossomed over Bullhead City, AZ, where it remained for nearly 90 minutes. The storm produced 70 mph winds, 1 inch diameter hail and tremendous flash flooding in the community. Numerous roads were covered in a foot or more of water resulting in at least 5 people being swift water rescued. Nearby Laughlin, NV, also saw streets flooded from this same storm. Later that night, another thunderstorm developed southeast of Las Vegas and as it moved northeastward dropped nickel size hail in southeast Henderson before moving towards the south end of Lake Mead where it unleashed 70 mph that caused over \$300,000 in damages to floating docks and a few boats at the Las Vegas Boat Harbor.



A wall of mud raced across Highway 395 near Dunmovin, CA, on the afternoon of August 26<sup>th</sup> washing this tractor trailer truck off the road and damaging it. The photo on the right shows how far the truck was swept from the highway. Photos Courtesy: California Highway Patrol/Officer Dennis Cleland.

Storms once again grazed the heart of Las Vegas during August, resulting in just a trace of precipitation for the month at McCarran International Airport. Outlying areas, especially in Henderson, saw more rain with the highest monthly total being 0.70 inch at an automated station in Anthem. On August 29<sup>th</sup>, a strong upper-level trough moved across the West completely drying out the area in its wake on the 30<sup>th</sup>. As September progressed, it looked like all signs of the monsoon returning were gone. However, on September 6<sup>th</sup>, a strong upper level trough dove southward and began to pull moisture northward into the Mojave Desert. As the trough axis crossed the area on the morning of the 7<sup>th</sup>, it resulted in showers and thunderstorms developing across Mohave, Clark and southern Nye Counties. Over the Las Vegas Valley two batches of showers moved across the area. While the first batch mainly wet the west side of the valley, the second batch brought rain to all areas. At McCarran International Airport, a total of 0.01 inch was measured making it the first measurable precipitation to fall since April 22<sup>nd</sup>. The 137 day streak of no measurable precipitation at the official Las Vegas climate station would tie for the 6<sup>th</sup> longest ever on record since 1937. The area dried out behind the trough with the monsoon likely gone for good as of the middle of September. For Las Vegas, the monsoonal period defined as June 15<sup>th</sup> – September 15<sup>th</sup> ties 1962 as the second driest ever. Only 1944, which saw a trace fall in that time period, was drier. In Kingman, AZ, the total of 0.24 inch from June 15<sup>th</sup> - September 15<sup>th</sup> ranks as the 3<sup>rd</sup> driest ever since 1901 – beat out only by 0.07 inch in 1989 and 0.04 inch in 1928. Needles, CA, also saw their 3<sup>rd</sup> driest June 15<sup>th</sup>-September 15<sup>th</sup> on record with 0.09 inch falling. Only in 1978 with 0.06 inch and 2007 with 0.03 inch were drier. Lake Havasu City, AZ, saw their second driest June 15<sup>th</sup> - September 15<sup>th</sup> period on record dating back to 1967 with 0.06 inch – barely edging out the 0.05 inch in 1978.

**2010 Monsoon Season Rainfall Totals  
And Percent of Normal Precipitation From  
June 15<sup>th</sup> - September 15<sup>th</sup>:**

Bishop, CA	0.08"	51%
Barstow-Dagget, CA	0.51"	45%
Bullhead City, AZ	1.64"	129%
Caliente, NV	1.17"	49%
Death Valley, CA	0.01"	3%
Kingman, AZ	0.24"	8%
Lake Havasu City, AZ	0.06"	4%
Laughlin, NV	1.66"	178%
Mercury, NV	0.01"	1%
Mt. Charleston, NV	1.39"	23%
Needles, CA	0.09"	7%
Mesquite, NV	1.07"	N/A
Pahrump, NV	0.10"	10%
Pipe Springs N.M., AZ	2.18"	72%
Twentynine Palms, CA	0.05"	3%

**2010 Monsoon Season Rainfall Totals  
For The Las Vegas Valley  
From June 15<sup>th</sup> - September 15<sup>th</sup>:**

McCarran Int'l Airport	0.01" – 1% of normal
Anthem – Mesonet	1.13"
Centennial Hills	0.40"
Downtown Las Vegas – CCRFCD	0.04"
East Henderson – CCRFCD	0.67"
Flamingo & Boulder Highway	0.26"
Mountains Edge South	0.04"
Nellis Air Force Base	0.02"
North Las Vegas Airport	0.06"
North Las Vegas Co-Op	0.08"
NWS Las Vegas	0.17"
Pittman Wash at Wigwam	0.59"
Summerlin	0.18"
Tenaya & Washington	0.17"
West Aliante	0.41"

**Newest Member of the NWS Las Vegas Forecast Office**

The National Weather Service family would like to welcome our newest Meteorologist Intern, Justin Gibbs. Justin comes to Las Vegas from the Tennessee Emergency Management Agency located in Nashville, TN, where he had worked since graduating from the University of South Alabama. Justin played a large role with the Emergency Management Agency during the unprecedented flooding in Nashville this past Spring and recently received a commendation from the Tennessee Governor. Outside of work, Justin enjoys football and basketball and has spent plenty of time getting to know the region. Once again, a big welcome to our newest member of the office.



Image of the NWS - Las Vegas



## Storm Spotter Photo Page

I would like to thank all the Spotters who sent in pictures these past few months. I am hoping to use as many as I can, but if you don't see your photo here, it may be used in the Spotter Training Course. Thanks again for all your efforts and we enjoy receiving your photos.



Rain Shaft from Thunderstorm - Courtesy of Dolly Burton



Mammatus over Fort Irwin - Courtesy of John Fertsch



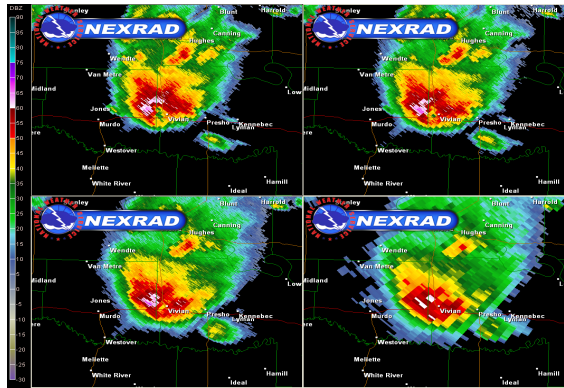
Lightning over the Hualapai - Courtesy of Herberta Schroeder



Flash flooding in Meadview, AZ - Courtesy Meadview FD

## Hail Size Record Broken

On July 22, 2010, the largest hail stone ever recorded fell in Vivian, SD. It was 8.0 inches in diameter, 18.625 inches in circumference, and weighed 1.9375 pounds. It was estimated that the updraft in the thunderstorm that would have allowed for this size hail stone to form was 160-180 mph.



4-Panel Radar Imagery from the record setting hail storm.

## Keep Track Of The Weather With CoCoRaHS



Are you curious as to how much rain or snow fell each time a storm moves through the area? Do you have a rain gauge you frequently check for rain? If so, the National Weather Service in Las Vegas would like to encourage you to join CoCoRaHS, known as the Community Collaborative Rain, Hail and Snow Network. This network allows you to report online how much rain or snow you may have received or even if you saw any hail. Additional comments on the weather in your area that day such as strong winds or storm reports such as flooding can also be submitted. Not only is this information useful to forecasters for verifying forecasts and warnings, but CoCoRaHS also keeps an online record of your reports. This data can then be sorted to compile totals for a given site or see how frequently you received rain or snow in a given time frame. All you have to do to join is visit <http://www.cocorahs.org/> and click on "Join CoCoRaHS" on the left sidebar menu and fill out a short form. While we welcome new observers in all of our communities, our office is especially interested in observers on the north side of the Las Vegas Valley, Mt. Charleston, the Laughlin-Bullhead City area, Searchlight, Beatty, anywhere in Esmeralda County, the Kingman/central Mohave County area and the Owens Valley. Please contact [Faith.Borden@noaa.gov](mailto:Faith.Borden@noaa.gov) or [Andy.Gorelow@noaa.gov](mailto:Andy.Gorelow@noaa.gov) with any questions.



## Desert Weather Word Search

D	R	O	U	G	H	T	A	H	S	B	L	O	F	C	A	I	Y	R	X
U	U	A	L	C	M	E	N	E	L	E	D	H	R	O	T	R	E	U	W
T	N	W	W	R	T	H	M	A	E	I	D	V	W	L	U	E	Q	N	A
S	Y	T	I	L	I	E	G	T	V	H	U	M	I	D	I	T	Y	O	D
T	L	O	B	N	P	L	E	S	U	O	F	L	O	B	D	B	U	F	F
O	D	I	N	G	D	U	S	T	S	T	O	R	M	H	O	B	S	F	L
H	Y	K	G	R	C	Y	S	R	N	M	D	B	A	Y	I	L	E	E	A
A	A	F	O	H	R	S	G	O	L	K	H	S	U	H	I	O	E	N	S
Z	F	Z	Z	E	T	Z	P	K	B	I	D	C	V	F	A	W	A	S	H
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D	A	L	K	Z	R	B	I	O	L	E	E	D	I	L	C	Z	U	Z	G

Blowing Sand  
Clouds  
Cold  
Drought  
Dry  
Dust Devil  
Dust Storm  
Dusty  
Flash Flood

Flurries  
Fog  
Hail  
Hazy  
Heat Stroke  
Heavy Rain  
Hot  
Humidity  
Lightning

Monsoon  
Runoff  
Storm  
Sunny  
Thunder  
Tornado  
Wash  
Windy